

Claims

1. (canceled): A portable device comprising:

a first communication mode adapted to permit the portable device to transmit and to receive an infrared data association (IrDA) signal over a first communication range; and

5 a second communication mode adapted to permit the portable device to transmit and to receive an extended range infrared communication (ERIC) signal over a second communication range that is greater than the first communication range.

2. (canceled): A portable device according to claim 1 further comprising:

10 an IrDA compliant transceiver including:

a transmitter adapted to transmit the IrDA signal over the first communication range when the portable device is operating in the first communication mode and adapted to transmit the ERIC signal over the second communication range when the portable device is operating in the second communication mode; and

15 a receiver adapted to receive the IrDA signal over the first communication range when the portable device is operating in the first communication mode and adapted to receive the ERIC signal over the second communication range when the portable device is operating in the second communication mode.

3. (canceled): A portable device according to claim 2 wherein the transmitter further comprises:

20 a near infrared emitter diode adapted to convert a transmit signal from an electrical signal into an infrared signal that is representative of the electrical signal, wherein the transmit signal represents the IrDA signal when the portable device is operating in the first communication mode, and wherein the transmit signal represents the ERIC signal when the portable device is operating in the second communication mode.

25 4. (canceled): A portable device according to claim 2 wherein the receiver further comprises:

a near infrared detector diode adapted to convert a receive signal from an infrared signal into an electrical signal that is representative of the infrared signal, wherein the receive signal represents the IrDA signal when the portable device is operating in the first communication mode, and wherein the receive signal represents the ERIC signal when the portable device is operating in the second communication mode.

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5. (canceled): A portable device according to claim 1 further comprising:

a controller adapted to control a selection of one of the first communication mode and the second communication mode responsive to a communication mode control signal.

35 6. (canceled): A portable device according to claim 1 further comprising:

a memory device including:

a first software routine adapted to cause the portable device to operate in the first communication mode; and

a second software routine adapted to cause the portable device to operate in the second communication mode.

7. (currently amended): A portable device ~~according to claim 1 further~~ comprising:

a first communication mode adapted to permit the portable device to transmit and to receive an infrared data association (IrDA) signal over a first communication range;

a second communication mode adapted to permit the portable device to transmit and to receive an extended range infrared communication (ERIC) signal over a second communication range that is greater than the first communication range; and

a data rate generator adapted to cause the portable device to:

transmit and to receive the IrDA signal at an IrDA data rate selected from a plurality of IrDA data rates when the portable device is operating in the first communication mode,

transmit the ERIC signal at a first ERIC data rate when the portable device is operating in the second communication mode, and

receive the ERIC signal at a second ERIC data rate when the portable device is operating in the second communication mode.

8. (original): A portable device according to claim 7 wherein the first ERIC data rate is lower than the second ERIC data rate.

9. (original): A portable device according to claim 7 wherein the second ERIC data rate is equal to a maximum IrDA data rate.

10. (original): A portable device according to claim 7 further comprising:

a signal modulator/demodulator (modem) including:

an IrDA signal modulator adapted to transmit the IrDA signal using an IrDA signal modulation method when the portable device is operating in the first communication mode;

an IrDA signal demodulator adapted to receive the IrDA signal using an IrDA signal demodulation method when the portable device is operating in the first communication mode and adapted to receive the ERIC signal using the IrDA signal demodulation method when the portable device is operating in the second communication mode; and

an ERIC signal modulator adapted to transmit the ERIC signal using an ERIC signal modulation method when the portable device is operating in the second communication mode.

11. (original): A portable device according to claim 10 wherein the ERIC signal modulation method further comprises:

amplitude modulation (AM).

12. (original): A portable device according to claim 11 wherein the amplitude modulation (AM) further comprises:

a main carrier signal representing the ERIC signal at an infrared frequency; and
a sub-carrier signal, modulated onto the main carrier signal, representing the ERIC signal at the first ERIC data rate.

13. (original): A portable device according to claim 10 wherein the signal modem further comprises:

an IrDA compliant signal encoder/decoder (ENDEC) including:

a signal encoder adapted to encode the IrDA signal, using the IrDA signal modulation method, to generate an encoded IrDA signal when the portable device is transmitting the IrDA signal in the first communication mode;

a signal bypass path coupled to an input terminal and an output terminal of the signal encoder and adapted to route the ERIC signal, having the ERIC signal modulation method, around the signal encoder when the portable device is transmitting the ERIC signal in the second communication mode; and

a signal decoder adapted to decode the IrDA signal, using the IrDA signal demodulation method, to generate an decoded IrDA signal when the portable device is receiving the IrDA signal in the first communication mode, and adapted to decode the ERIC signal, using the IrDA signal demodulation method, to generate a decoded ERIC signal when the portable device is operating in the second communication mode.

14. (canceled): A portable device according to claim 1 further comprising:

a signal modulator/demodulator (modem) including:

an IrDA signal modulator adapted to transmit the IrDA signal using an IrDA signal modulation method when the portable device is operating in the first communication mode,

an IrDA signal demodulator adapted to receive the IrDA signal using an IrDA signal demodulation method when the portable device is operating in the first communication mode and adapted to receive the ERIC signal using the IrDA signal demodulation method when the portable device is operating in the second communication mode; and

an ERIC signal modulator adapted to transmit the ERIC signal using an ERIC signal modulation method when the portable device is operating in the second communication mode.

15. (canceled): A portable device according to claim 14 wherein the ERIC signal modulation method further comprises:

amplitude modulation (AM).

16. (canceled): A portable device according to claim 15 wherein the amplitude modulation (AM) further comprises:

a main carrier signal representing the ERIC signal at an infrared frequency; and

a sub-carrier signal, modulated onto the main carrier signal, representing the ERIC signal at a first ERIC data rate.

17. (currently amended): A portable device comprising according to claim 14 wherein the signal modem
~~further comprises:~~

a first communication mode adapted to permit the portable device to transmit and to receive an infrared data association (IrDA) signal over a first communication range;

a second communication mode adapted to permit the portable device to transmit and to receive an extended range infrared communication (ERIC) signal over a second communication range that is greater than the first communication range;

a signal modulator /demodulator (dodem) including:

an IrDA signal modulator adapted to transmit the IrDA signal using an IrDA signal modulation method when the portable device is operating in the first communication mode;

an IrDA signal demodulator adapted to receive the IrDA signal using an IrDA signal demodulation method when the portable device is operating in the first communication mode and adapted to receive the ERIC signal using the IrDA signal demodulation method when the portable device is operating in the second communication mode;

an ERIC signal modulator adapted to transmit the ERIC signal using an ERIC signal modulation method when the portable device is operating in the second communication mode; and

an IrDA compliant signal encoder/decoder (ENDEC) including:

a signal encoder adapted to encode the IrDA signal, using the IrDA signal modulation method, to generate an encoded IrDA signal when the portable device is transmitting the IrDA signal in the first communication mode;

a signal bypass path coupled to an input terminal and an output terminal of the signal encoder and adapted to route the ERIC signal, having the ERIC signal modulation method, around the signal encoder when the portable device is transmitting the ERIC signal in the second communication mode; and

a signal decoder adapted to decode the IrDA signal, using the IrDA signal demodulation method, to generate an decoded IrDA signal when the portable device is receiving the IrDA signal in the first communication mode, and adapted to decode the ERIC signal, using the IrDA signal demodulation method, to generate a decoded ERIC signal when the portable device is operating in the second communication mode.

18. (canceled): A portable device according to claim 1 further comprising:

a signal converter including:

a parallel to serial signal converter coupled to receive a transmit signal, representing the IrDA signal or the ERIC signal, and adapted to convert the transmit signal from a parallel data format to a serial data format; and

a serial to parallel signal converter coupled to receive the receive signal, representing the IrDA signal or the ERIC signal, and adapted to convert the receive signal from a serial data format to a parallel data format.

19. (canceled): A portable device according to claim 1 further comprising:

an input device adapted to generate an input signal for controlling the portable device when the portable device is operating in the first communication mode or the second communication mode; and

an output device adapted to generate an output signal responsive to receiving the IrDA signal when the portable device is operating in the first communication mode and responsive to receiving the ERIC signal when the portable device is operating in the second communication mode.

20. (canceled): A portable device comprising:

a memory device including:

a first software routine adapted to cause the portable device to operate in a first communication mode permitting the portable device to transmit and to receive an infrared data association (IrDA) signal over a first communication range; and

a second software routine adapted to cause the portable device to operate in a second communication mode permitting the portable device to transmit and to receive an extended range infrared communication (ERIC) signal over a second communication range that is greater than the first communication range; and

an IrDA compliant transceiver including:

a transmitter adapted to transmit the IrDA signal over the first communication range when the portable device is operating in the first communication mode and adapted to transmit the ERIC signal over

the second communication range when the portable device is operating in the second communication mode;
and

a receiver adapted to receive the IrDA signal over the first communication range when the portable device is operating in the first communication mode and adapted to receive the ERIC signal over the second communication range when the portable device is operating in the second communication mode.

21. (canceled): A portable device according to claim 20 wherein the transmitter further comprises:

a near infrared emitter diode adapted to convert a transmit signal from an electrical signal into an infrared signal that is representative of the electrical signal, wherein the transmit signal represents the IrDA signal when the portable device is operating in the first communication mode, and wherein the transmit signal represents the ERIC signal when the portable device is operating in the second communication mode.

22. (canceled): A portable device according to claim 20 wherein the receiver further comprises:

a near infrared detector diode adapted to convert a receive signal from an infrared signal into an electrical signal that is representative of the infrared signal, wherein the receive signal represents the IrDA signal when the portable device is operating in the first communication mode, and wherein the receive signal represents the ERIC signal when the portable device is operating in the second communication mode.

23. (canceled): A portable device according to claim 20 further comprising:

a controller adapted to control a selection of one of the first communication mode and the second communication mode responsive to a communication mode control signal.

24. (currently amended): A portable device ~~according to claim 20 further~~ comprising:

a memory device including:

a first software routine adapted to cause the portable device to operate in a first communication mode permitting the portable device to transmit and to receive an infrared data association (IrDA) signal over a first communication range;

a second software routine adapted to cause the portable device to operate in a second communication mode permitting the portable device to transmit and to receive an extended range infrared communication (ERIC) signal over a second communication range that is greater than the first communication range;

an IrDA compliant transceiver including:

a transmitter adapted to transmit the IrDA signal over the first communication range when the portable device is operating in the first communication mode and adapted to transmit the ERIC signal

over the second communication range when the portable device is operating in the second communication mode; and

a receiver adapted to receive the IrDA signal over the first communication range when the portable device is operating in the first communication mode and adapted to receive the ERIC signal over the second communication range when the portable device is operating in the second communication mode; and

a data rate generator adapted to cause the portable device to:

transmit and to receive the IrDA signal at an IrDA data rate selected from a plurality of IrDA data rates when the portable device is operating in the first communication mode,

transmit the ERIC signal at a first ERIC data rate when the portable device is operating in the second communication mode, and

receive the ERIC signal at a second ERIC data rate when the portable device is operating in the second communication mode.

25. (original): A portable device according to claim 24 wherein the first ERIC data rate is lower than the second ERIC data rate.

26. (original): A portable device according to claim 24 wherein the second ERIC data rate is equal to a maximum IrDA data rate.

27. (original): A portable device according to claim 24 further comprising:

a signal modulator/demodulator (modem) including:

an IrDA signal modulator adapted to transmit the IrDA signal using an IrDA signal modulation method when the portable device is operating in the first communication mode,

an IrDA signal demodulator adapted to receive the IrDA signal using an IrDA signal demodulation method when the portable device is operating in the first communication mode and adapted to receive the ERIC signal using the IrDA signal demodulation method when the portable device is operating in the second communication mode; and

an ERIC signal modulator adapted to transmit the ERIC signal using an ERIC signal modulation method when the portable device is operating in the second communication mode.

28. (original): A portable device according to claim 27 wherein the ERIC signal modulation method further comprises:

amplitude modulation (AM).

29. (original): A portable device according to claim 27 wherein the amplitude modulation (AM) further comprises:

a main carrier signal representing the ERIC signal at an infrared frequency; and

a sub-carrier signal, modulated onto the main carrier signal, representing the ERIC signal at the first
5 ERIC data rate.

30. (original): A portable device according to claim 27 wherein the signal modem further comprises:

an IrDA compliant signal encoder/decoder (ENDEC) including:

a signal encoder adapted to encode the IrDA signal, using the IrDA signal modulation method, to
10 generate an encoded IrDA signal when the portable device is transmitting the IrDA signal in the first communication mode;

a signal bypass path coupled to an input terminal and an output terminal of the signal encoder and adapted to route the ERIC signal, having the ERIC signal modulation method, around the signal encoder when the portable device is transmitting the ERIC signal in the second communication mode; and

15 a signal decoder adapted to decode the IrDA signal, using the IrDA signal demodulation method, to generate an decoded IrDA signal when the portable device is receiving the IrDA signal in the first communication mode, and adapted to decode the ERIC signal, using the IrDA signal demodulation method, to generate a decoded ERIC signal when the portable device is operating in the second communication mode.

20 31. (canceled): A portable device according to claim 20 further comprising:

a signal modulator/demodulator (modem) including:

an IrDA signal modulator adapted to transmit the IrDA signal using an IrDA signal modulation method when the portable device is operating in the first communication mode,

25 an IrDA signal demodulator adapted to receive the IrDA signal using an IrDA signal demodulation method when the portable device is operating in the first communication mode and adapted to receive the ERIC signal using the IrDA signal demodulation method when the portable device is operating in the second communication mode; and

an ERIC signal modulator adapted to transmit the ERIC signal using an ERIC signal modulation method when the portable device is operating in the second communication mode.

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32. (canceled): A portable device according to claim 31 wherein the ERIC signal modulation method further comprises:

amplitude modulation (AM).

33. (canceled): A portable device according to claim 32 wherein the amplitude modulation (AM) further comprises:

a main carrier signal representing the ERIC signal at an infrared frequency; and

a sub-carrier signal, modulated onto the main carrier signal, representing the ERIC signal at a first ERIC data rate.

34. (currently amended): A portable device ~~comprising according to claim 31 wherein the signal modem further comprises:~~

a memory device including:

a first software routine adapted to cause the portable device to operate in a first communication mode permitting the portable device to transmit and to receive an infrared data association (IrDA) signal over a first communication range; and

a second software routine adapted to cause the portable device to operate in a second communication mode permitting the portable device to transmit and to receive an extended range infrared communication (ERIC) signal over a second communication range that is greater than the first communication range;

an IrDA compliant transceiver including:

a transmitter adapted to transmit the IrDA signal over the first communication range when the portable device is operating in the first communication mode and adapted to transmit the ERIC signal over the second communication range when the portable device is operating in the second communication mode;

and

a receiver adapted to receive the IrDA signal over the first communication range when the portable device is operating in the first communication mode and adapted to receive the ERIC signal over the second communication range when the portable device is operating in the second communication mode;

a signal modulator/demodulator (modem) including:

an IrDA signal modulator adapted to transmit the IrDA signal using an IrDA signal modulation method when the portable device is operating in the first communication mode;

an IrDA signal demodulator adapted to receive the IrDA signal using an IrDA signal demodulation method when the portable device is operating in the first communication mode and adapted to receive the ERIC signal using the IrDA signal demodulation method when the portable device is operating in the second communication mode; and

an ERIC signal modulator adapted to transmit the ERIC signal using an ERIC signal modulation method when the portable device is operating in the second communication mode;

and

an IrDA compliant signal encoder/decoder (ENDEC) including:

a signal encoder adapted to encode the IrDA signal, using the IrDA signal modulation method, to generate an encoded IrDA signal when the portable device is transmitting the IrDA signal in the first communication mode;

a signal bypass path coupled to an input terminal and an output terminal of the signal encoder and adapted to route the ERIC signal, having the ERIC signal modulation method, around the signal encoder when the portable device is transmitting the ERIC signal in the second communication mode; and

a signal decoder adapted to decode the IrDA signal, using the IrDA signal demodulation method, to generate an decoded IrDA signal when the portable device is receiving the IrDA signal in the first communication mode, and adapted to decode the ERIC signal, using the IrDA signal demodulation method, to generate a decoded ERIC signal when the portable device is operating in the second communication mode.

35. (canceled): A portable device according to claim 20 further comprising:

a signal converter including:

a parallel to serial signal converter coupled to receive a transmit signal, representing the IrDA signal or the ERIC signal, and adapted to convert the transmit signal from a parallel data format to a serial data format; and

a serial to parallel signal converter coupled to receive the receive signal, representing the IrDA signal or the ERIC signal, and adapted to convert the receive signal from a serial data format to a parallel data format.

36. (canceled): A portable device according to claim 20 further comprising:

an input device adapted to generate an input signal for controlling the portable device when the portable device is operating in the first communication mode or the second communication mode; and

an output device adapted to generate an output signal responsive to receiving the IrDA signal when the portable device is operating in the first communication mode and responsive to receiving the ERIC signal when the portable device is operating in the second communication mode.

37. (original): A portable device comprising:

a memory device including:

a first software routine adapted to cause the portable device to operate in a first communication mode permitting the portable device to transmit and to receive an infrared data association (IrDA) signal over a first communication range; and

a second software routine adapted to cause the portable device to operate in a second communication mode permitting the portable device to transmit and to receive an extended range infrared communication (ERIC) signal over a second communication range that is greater than the first communication range;

an IrDA compliant transceiver including:

a transmitter adapted to transmit the IrDA signal over the first communication range when the portable device is operating in the first communication mode and adapted to transmit the ERIC signal over the second communication range when the portable device is operating in the second communication mode, wherein the transmitter further comprises:

a near infrared emitter diode adapted to convert a transmit signal from an electrical signal into an infrared signal that is representative of the electrical signal, wherein the transmit signal represents the IrDA signal when the portable device is operating in the first communication mode, and wherein the transmit signal represents the ERIC signal when the portable device is operating in the second communication mode; and

a receiver adapted to receive the IrDA signal over the first communication range when the portable device is operating in the first communication mode and adapted to receive the ERIC signal over the second communication range when the portable device is operating in the second communication mode, wherein the receiver further comprises:

a near infrared detector diode adapted to convert a receive signal from an infrared signal into an electrical signal that is representative of the infrared signal, wherein the receive signal represents the IrDA signal when the portable device is operating in the first communication mode, and wherein the receive signal represents the ERIC signal when the portable device is operating in the second communication mode;

a data rate generator adapted to cause the portable device to:

transmit and to receive the IrDA signal at an IrDA data rate selected from a plurality of IrDA data rates when the portable device is operating in the first communication mode,

transmit the ERIC signal at a first ERIC data rate when the portable device is operating in the second communication mode, and

receive the ERIC signal at a second ERIC data rate, greater than the first ERIC data rate, when the portable device is operating in the second communication mode;

a signal modulator/demodulator (modem) including:

an IrDA signal modulator adapted to transmit the IrDA signal using an IrDA signal modulation method when the portable device is operating in the first communication mode;

an IrDA signal demodulator adapted to receive the IrDA signal using an IrDA signal demodulation method when the portable device is operating in the first communication mode and adapted to receive the ERIC signal using the IrDA signal demodulation method when the portable device is operating in the second communication mode; and

an ERIC signal modulator adapted to transmit the ERIC signal using an ERIC signal modulation method when the portable device is operating in the second communication mode, wherein the ERIC signal

modulation method further comprises amplitude modulation (AM), and wherein the amplitude modulation (AM) further comprises:

a main carrier signal representing the ERIC signal at an infrared frequency; and

a sub-carrier signal, modulated onto the main carrier signal, representing the ERIC signal at the first ERIC data rate,

wherein the signal modem further comprises:

an IrDA compliant signal encoder/decoder (ENDEC) including:

a signal encoder adapted to encode the IrDA signal, using the IrDA signal modulation method, to generate an encoded IrDA signal when the portable device is transmitting the IrDA signal in the first communication mode;

a signal bypass path coupled to an input terminal and an output terminal of the signal encoder and adapted to route the ERIC signal, having the ERIC signal modulation method, around the signal encoder when the portable device is transmitting the ERIC signal in the second communication mode; and

a signal decoder adapted to decode the IrDA signal, using the IrDA signal demodulation method, to generate an decoded IrDA signal when the portable device is receiving the IrDA signal in the first communication mode, and adapted to decode the ERIC signal, using the IrDA signal demodulation method, to generate a decoded ERIC signal when the portable device is operating in the second communication mode;

a signal converter including:

a parallel to serial signal converter coupled to receive the transmit signal, representing the IrDA signal or the ERIC signal, and adapted to convert the transmit signal from a parallel data format to a serial data format; and

a serial to parallel signal converter coupled to receive the receive signal, representing the IrDA signal or the ERIC signal, and adapted to convert the receive signal from a serial data format to a parallel data format;

a controller adapted to control a selection of one of the first communication mode and the second communication mode responsive to a communication mode control signal;

an input device adapted to generate an input signal for controlling the portable device when the portable device is operating in the first communication mode or the second communication mode; and

an output device adapted to generate an output signal responsive to receiving the IrDA signal when the portable device is operating in the first communication mode and responsive to receiving the ERIC signal when the portable device is operating in the second communication mode.

38. (original): A portable device according to claim 37 wherein the data rate generator, the signal modulator/demodulator (modem) that comprises the IrDA compliant signal encoder/decoder (ENDEC), the signal converter, are integrated together within a universal asynchronous receiver transmitter (UART).